

# LXF-Dxx-40D(I)

## SMF XFP DWDM 10Gbps 40km Transceiver

### PRODUCT FEATURES

- Compliant with XFP MSA
- Operating Data Rate up to 10Gbps
- Available in all C-band Wavelength on the 100Ghz DWDM ITU Grid
- Temperature-stabilized DWDM EML Transmitter
- Hot-Pluggable XFP Footprint Duplex LCConnector Interface
- Power Dissipation < 5W
- Class 1 FDA and IEC60825-1 Laser Safety Compliant
- Operating Temperature:  
Standard: 0°C ~+70°C  
Industrial:-40°C ~+85°C
- 2-Wire Interface for Integrated Digital Diagnostic Monitoring
- Compliant with SFF-8472

### APPLICATIONS

- 10GBASE-ER/EW 10G Ethernet
- Switch to Switch Infrastructure

### Ordering information

Part No.	Data Rate	Fiber	Power Budget	Interface	Temp.	DDMI
LXF-Dxx-40D	10.3125Gbps	SMF	14dB	LC	0°C~70°C	Yes
LXF-Dxx-40DI	10.3125Gbps	SMF	14dB	LC	-40°C~85°C	Yes

## DWDM Wavelength\*

Channel(XX)	Frequency(THz)	Center Wavelength(nm)
17	191.7	1563.86
18	191.8	1563.05
19	191.9	1562.23
20	192.0	1561.42
21	192.1	1560.61
22	192.2	1559.79
23	192.3	1558.98
24	192.4	1558.17
25	192.5	1557.36
26	192.6	1556.55
27	192.7	1555.75
28	192.8	1554.94
29	192.9	1554.13
30	193.0	1553.33
31	193.1	1552.52
32	193.2	1551.72
33	193.3	1550.92
34	193.4	1550.12
35	193.5	1549.32
36	193.6	1548.51
37	193.7	1547.72
38	193.8	1546.92
39	193.9	1546.12
40	194.0	1545.32
41	194.1	1544.53
42	194.2	1543.73
43	194.3	1542.94
44	194.4	1542.14
45	194.5	1541.35
46	194.6	1540.56
47	194.7	1539.77
48	194.8	1538.98
49	194.9	1539.19
50	195.0	1537.40
51	195.1	1536.61
52	195.2	1535.82
53	195.3	1535.04
54	195.4	1534.25
55	195.5	1533.47
56	195.6	1532.68
57	195.7	1531.90

58	195.8	1531.12
59	195.9	1530.33
60	196.0	1529.55
61	1961.1	1528.77

## I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	TS	-40	+85	°C
Maximum Supply Voltage1	VCC3	-0.5	4.0	V
Maximum Supply Voltage2	VCC5	-0.5	6.0	V
Operating Relative Humidity			95	%

\*Exceeding any one of these values may destroy the device immediately!

## II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	
Operating Case Temperature	Tc	LXF-Dxx-40D	0		+70	°C
		LXF-Dxx-40DI	-40		+85	°C
Supply Voltage1	Vcc3	3.13	3.3	3.45	V	
Supply Voltage2	Vcc5	4.75	5.0	5.25	V	
Data Rate			10.3125		Gbps	

## III. Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Main Supply Voltage	Vcc5	4.75		5.25	V
Supply Voltage#2	Vcc3	3.13		3.45	V
Supply Current-Vcc5	Icc5			500	mA
Supply Current-Vcc3	Icc3			750	mA
Module total power	P			5	W
<b>Transmitter</b>					
Input differential impedance	Rin		100		
Differential data input swing (Note1)	Vin,pp	120		820	mV
Transmit Disable Voltage	VD	2.0		Vcc	V
Transmit Enable Voltage	VEN	GND		GND+ 0.8	V
Transmit Disable Assert Time				10	us
<b>Receiver</b>					
Differential data output swing (Note1)	Vout,pp	340	650	850	mV
RX Rise time (20 – 80%)	tr			38	ps
RX Fall time (20 – 80%)	tf			38	ps
LOS Fault (Note2)	VLOS fault	Vcc – 0.5		VccHOST	V

LOS Normal <sup>(Note2)</sup>	VLOS norm	GND		GND+0.5	V
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Note1: After internal AC coupling.

Note2: Loss of signal is open collector to be pulled up with a 4.7k – 10kohm resistor to 3.15 – 3.6V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

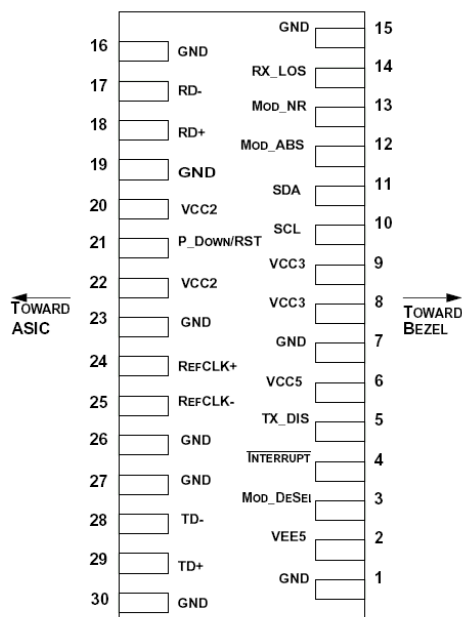
## IV. Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Data Rate			10.3125		Gbps
<b>Transmitter</b>					
Center Wavelength Spacing	$\lambda_c$		0.8		nm
Spectral Width (-20dB)	$\Delta\lambda$			1	nm
Side Mode Suppression Ratio	SMSR	30			dB
Average Output Power <sup>*(Note3)</sup>	Pout	-1		4	dBm
Extinction Ratio <sup>*(Note3)</sup>	ER	8.2			dB
Pout@TX Disable Asserted	Pout			-30	dBm
<b>Receiver</b>					
Center Wavelength	$\lambda_c$	1260		1600	nm
Receiver Sensitivity <sup>*(Note4)</sup>	Pmin			-15.8	dBm
Receiver Overload	Pmax	-1			dBm
LOS De-Assert	LOSD			-17	dBm
LOS Assert	LOSA	-29			dBm
LOS Hysteresis		1			dB

Note3. Output power is coupled into a 9/125 $\mu$ m SMF.

Note4. Measured with a PRBS 231-1 test pattern @10.3125Gbps.

## V. Pin Diagram



## VI. Pin Descriptions

Pin	Symbol	Function	Notes
1	GND	Module Ground	1
2	VEE5	Optional –5.2 Power Supply – Not Required	
3	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	
4	Interrupt	Interrupt; Indicates presence of an important condition which can be read over the serial 2-wire interface	2
5	TX_DIS	Transmitter Disable; Transmitter laser source turned off	
6	VCC5	+5 Power Supply	
7	GND	Module Ground	1
8	VCC3	+3.3V Power Supply	
9	VCC3	+3.3V Power Supply	
10	SCL	Serial 2-wire interface clock	2
11	SDA	Serial 2-wire interface data line	2
12	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	2
13	Mod_NR	Module Not Ready;	2
14	RX_LOS	Receiver Loss of Signal indicator	2
15	GND	Module Ground	1
16	GND	Module Ground	1
17	RD-	Receiver inverted data output	
18	RD+	Receiver non-inverted data output	
19	GND	Module Ground	1
20	VCC2	+1.8V Power Supply – Not required	
21	P_Down/ RST	Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset  Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface equivalent to a power cycle.	
22	VCC2	+1.8V Power Supply – Not required	
23	GND	Module Ground	1
24	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – Not required	3
25	RefCLK-	Reference Clock inverted input, AC coupled on the host board – Not required	3
26	GND	Module Ground	1
27	GND	Module Ground	1
28	TD-	Transmitter inverted data input	
29	TD+	Transmitter non-inverted data input	
30	GND	Module Ground	1

NOTE1. Module circuit ground is isolated from module chassis ground within the module.

NOTE2. Open collector; should be pulled up with 4.7k-10k ohms on host board to a voltage between 3.15V and 3.6V.

NOTE3. A Reference Clock input is not required.

## VII. Digital Diagnostic Functions

LXF-Dxx-40D(I) Small Form Factor 10Gb/s (XFP) transceivers are compliant with the current XFP Multi-Source Agreement (MSA) Specification

Rev 4.5. As defined by the XFP MSA, Lightrend XFP transceivers provide digital diagnostic functions via a 2-wire serial interface, which allow real time access to the following operating parameters:

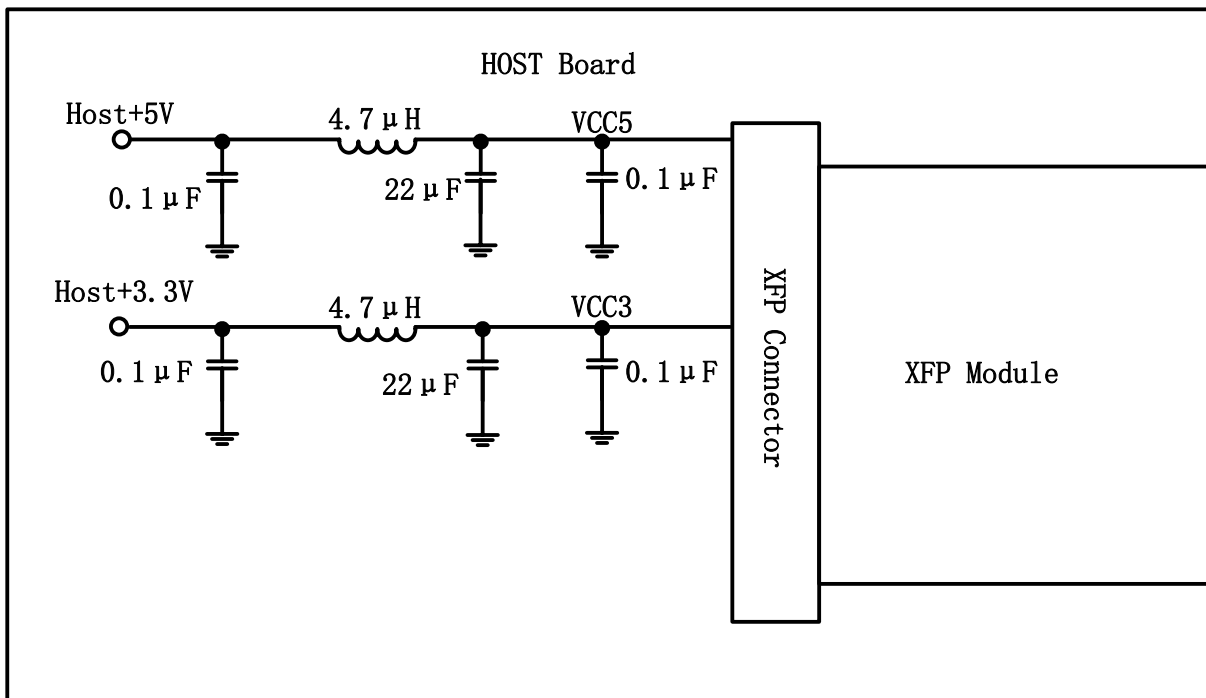
- .Transceiver temperature
- .Laser bias current
- .Transmitted optical power
- .Received optical power
- .Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-user when particular operating parameters are outside of a factory-set normal range. The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal(SCL pin) is generated by the host. The positive edge clocks data into the XFP transceiver into those segments of its memory map that.

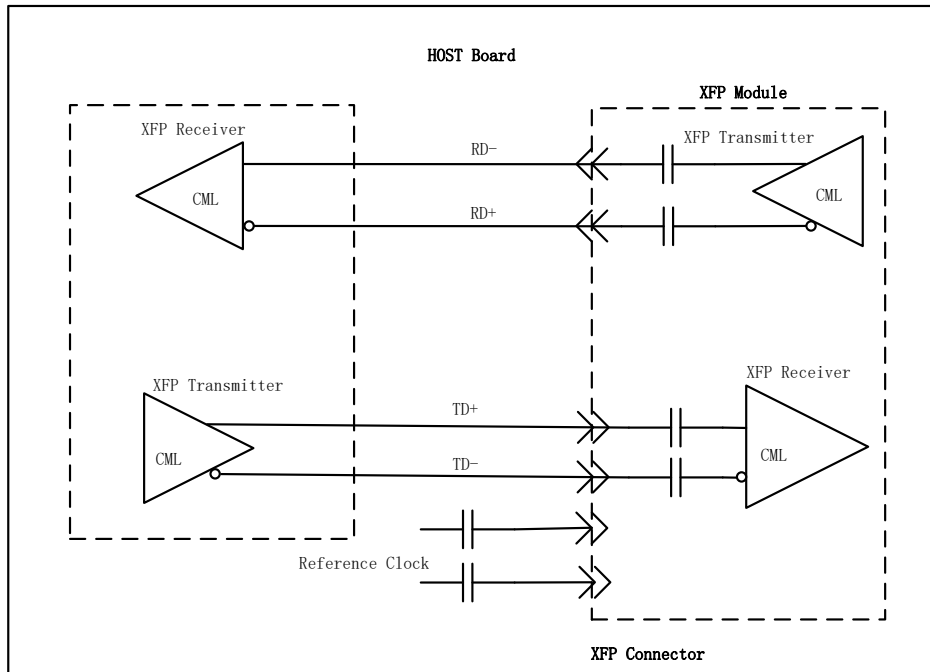
Are not write-protected. The negative edge clocks data from the XFP transceiver.

The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially. The 2-wire serial interface provides sequential or random access to the 8 bit parameters, addressed from 000h to the maximum address of the memory.

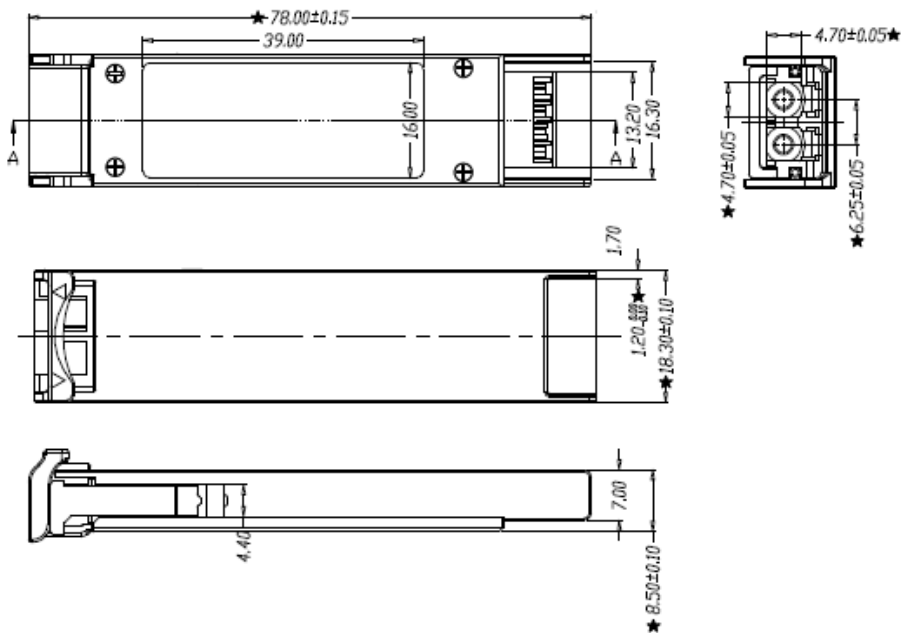
## VIII. Recommended Host Board Power Supply Circuit



### IX. Recommend High-speed Interface Circuit



### X. Mechanical Specifications(Unit: mm)



### Revision History

Version No.	Date	Description
1.0	June 24, 2021	Preliminary datasheet